

## A 5-year profile of the incidence of total joint replacement in South Africa (1985 - 1989)

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**Abstract** This survey was conducted to determine the number of total joint replacements (TJR) carried out annually in South Africa from 1985 to 1989 and the number of surgeons performing these procedures. During this period there was a 28% increase in the number of TJRs performed annually with an average increase of 20% in total hip replacements and 40% in total knee replacements. The number of surgeons involved in joint replacement during the survey period decreased by 7% in state-subsidised institutions but increased by 57% in the private sector. This is reflected in the number of TJRs performed each year, which has remained static in the state institutions but exhibits a threefold increase in the private sector. This probably reflects a shift in emphasis in state health care policy.

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Total joint replacement (TJR) has revolutionised the treatment of advanced joint disease and is now probably the commonest elective procedure in orthopaedic surgery.

Hori *et al.*<sup>1</sup> were among the first authors to review the incidence of TJR in a community. They established the number of TJRs performed annually in Illinois and extrapolated these figures to embrace the whole of the USA. Huiskes<sup>2</sup> reported on the number of replacement arthroplasties carried out in the Netherlands while Lindberg *et al.*<sup>3</sup> and Gschwend<sup>4</sup> carried out similar reviews in Sweden and Switzerland respectively. Zaousis and Patikas<sup>5</sup> reported on the incidence of total hip replacement in Greece over a period of 20 years.

Although there have been regional analyses, an accurate review of the number of total joint arthroplasties performed throughout South Africa has never been undertaken. This information is important to state-funded and private health care institutions, government-subsidised research foundations, commercial orthopaedic equipment companies and educational centres.

The objectives of this survey were therefore to: (i) establish the incidence of TJR in South Africa over a 5-year period; (ii) identify surgical trends; (iii) determine the number of surgeons performing joint replacement procedures; and (iv) identify practice trends in the private and state health care sectors.

### Methodology

A questionnaire was drawn up which posed three questions.

Firstly surgeons were asked to indicate whether they were: (i) in full-time provincial practice; (ii) exclusively

in private practice; or (iii) in private practice with sessions in a provincial hospital.

The second question requested the approximate percentage of all operations that joint replacement surgery formed. Five choices of answer were provided to accommodate responses ranging from 0% to 100%.

Finally surgeons were asked to indicate the number of TJRs carried out annually from 1985 to 1989. This question was presented in tabular form and identified the total number of primary and revision hip, knee, elbow and shoulder joint replacements. A column was also included to establish in each instance whether the implants were inserted with or without bone cement.

The questionnaire together with an explanatory letter was then circulated to the 293 orthopaedic surgeons practising in South Africa.

On receipt of the completed questionnaires, a computerised database was established to facilitate the analysis of the results.

### Results

Sixty per cent of all orthopaedic surgeons contacted responded. This represented a fairly equitable response in each of the four provinces. It was assumed that these statistics were representative, and they were extrapolated from in order to obtain a national estimate.

The percentage of respondents who were performing TJR is shown in Fig. 1. This varied between 61,6% and 69,5% and possibly reflects the surgeons' interest in replacement arthroplasty.

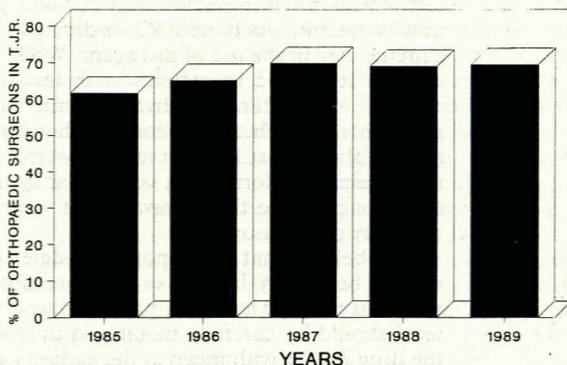


FIG. 1.  
TJR surgeon population.

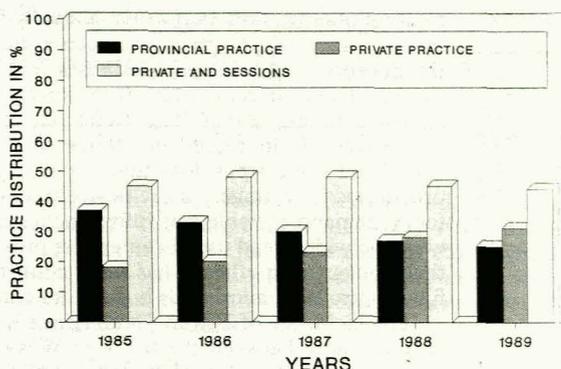
Fig. 2 reflects the practice distribution of all orthopaedic surgeons in South Africa, while Fig. 3 provides similar information for surgeons performing TJR. It is noteworthy that while the total number of surgeons has increased, the percentage of those working in provincial hospitals has decreased.

Table I lists the number of hip, knee, elbow and shoulder joint replacements performed annually in South Africa from 1985 to 1989. Fig. 4 shows the proportion of cemented versus uncemented replacement arthroplasties.

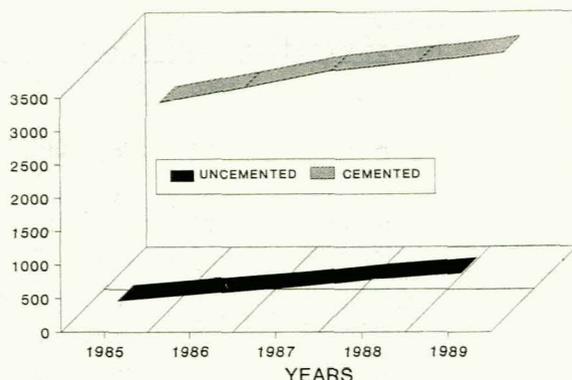
The number of revisions performed annually is shown in Table II, which also indicates the anticipated increase commensurate with the increase in the number of primary TJRs.

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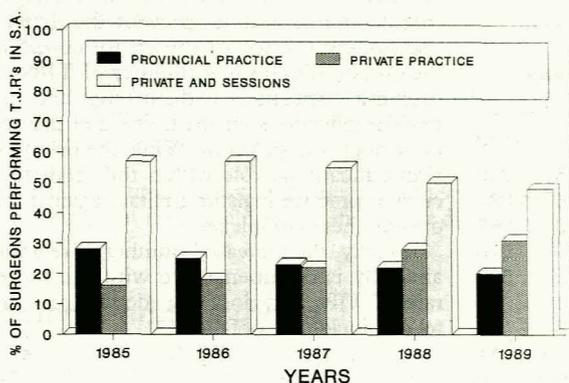
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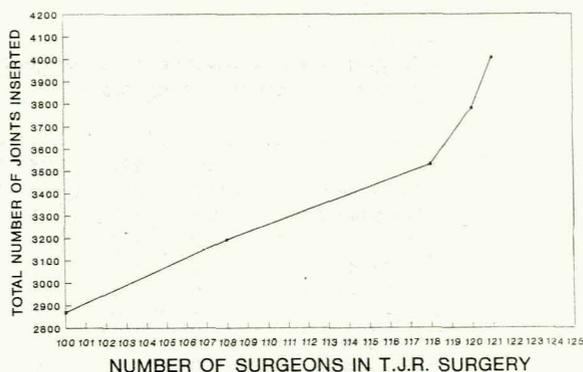
**FIG. 2.**  
Practice distribution of orthopaedic surgeons.



**FIG. 4.**  
Incidence of cemented v. uncemented TJRs.



**FIG. 3.**  
Practice distribution of orthopaedic surgeons performing TJRs.



**FIG. 5.**  
Number of TJRs in relation to the number of surgeons performing them.

**TABLE I.**  
Number of TJRs performed annually in South Africa (1985 - 1989)

	1985	1986	1987	1988	1989
Hip	2 093	2 316	2 451	2 556	2 637
Cemented	1 850	1 967	2 064	2 084	2 123
Uncemented	243	348	387	472	514
Knee	749	836	1 014	1 143	1 253
Cemented	728	819	944	1 032	1 095
Uncemented	21	17	70	111	158
Elbow	1	3	5	14	17
Cemented	1	3	5	13	16
Uncemented	0	0	0	1	1
Shoulder	27	37	61	67	99
Cemented	23	34	57	67	98
Uncemented	4	3	4	0	1
Annual total	2 870	3 192	3 531	3 780	4 006

**TABLE II.**  
Number of revisions performed annually in South Africa (1985 - 1989)

	1985	1986	1987	1988	1989
Hip	207	222	278	303	335
Cemented	165	173	213	221	258
Uncemented	42	49	65	82	77
Knee	37	53	91	64	61
Cemented	37	53	91	64	61
Uncemented	0	0	0	0	0
Elbow	0	0	0	1	1
Cemented	0	0	0	1	1
Uncemented	0	0	0	0	0
Shoulder	1	0	0	2	1
Cemented	1	0	0	2	1
Uncemented	0	0	0	0	0
Annual total	245	275	369	369	398

**TABLE III.**  
TJRs performed in provincial practice

	1985	1986	1987	1988	1989
Hip	603	568	714	670	619
Cemented	584	459	560	468	432
Uncemented	19	109	154	202	187
Knee	236	277	284	315	297
Cemented	234	273	264	287	261
Uncemented	2	4	20	28	36
Elbow	0	1	0	2	1
Cemented	0	1	0	1	0
Uncemented	0	0	0	1	1
Shoulder	18	15	19	26	26
Cemented	18	15	19	26	26
Uncemented	0	0	0	0	0

**Discussion**

Surveys such as these can provide useful information when practice profiles and practice trends are correlated with health care requirements in the community. Herberts *et al.*<sup>6</sup> have stressed the importance of multi-centre clinical trials in the assessment of total joint

TABLE IV.

## TJR's performed in private practice

	1985	1986	1987	1988	1989
Hip	240	301	344	471	688
Cemented	224	288	325	441	627
Uncemented	16	13	19	30	61
Knee	91	99	162	249	380
Cemented	87	90	136	220	325
Uncemented	4	9	26	29	55
Elbow	0	0	0	0	2
Cemented	0	0	0	0	2
Uncemented	0	0	0	0	0
Shoulder	3	0	2	1	9
Cemented	1	0	2	1	9
Uncemented	2	0	0	0	0
Annual total	334	400	508	721	1 079

TABLE V.

## TJR's performed by private practice surgeons doing sessions in government hospitals

	1985	1986	1987	1988	1989
Hip	1 250	1 447	1 393	1 415	1 330
Cemented	1 042	1 221	1 179	1 175	1 064
Uncemented	208	226	214	240	266
Knee	422	460	568	579	576
Cemented	407	456	544	525	509
Uncemented	15	4	24	54	67
Elbow	1	2	5	12	14
Cemented	1	2	5	12	14
Uncemented	0	0	0	0	0
Shoulder	6	22	40	40	64
Cemented	4	19	36	40	63
Uncemented	2	3	4	0	1
Annual total	1 679	1 931	2 006	2 046	1 984

arthroplasty. The Swedish community, numerically identified and traceable from birth, is ideal for such longitudinal and epidemiological studies. The migrant South African community provides almost insurmountable problems of patient recall and information retrieval.

Two hundred and ninety-three orthopaedic surgeons received questionnaires; 176 responded. This 60% response rate compares favourably with those in the reviews quoted earlier. The percentage return was similar from all provinces, suggesting a representative sample of respondents.

Predictably there has been a slight increase in the total number of orthopaedic surgeons in South Africa. Somewhat alarmingly, however, there has been a 7% reduction in the number of these in full-time hospital and academic practice, compared with a 57% increase of those in private practice. This shift is reflected in the incidence of replacement arthroplasty in the community. There has been no change in the number of TJRs performed in state-subsidised institutions, but there has been a three-fold, almost exponential, increase in the number of TJRs carried out in private practice.

The success of TJR has made it an increasingly popular form of treatment for severe arthritis. Thus, while the number of surgeons has increased by 16%, the

total number of TJRs performed annually has escalated by 28%. In particular there has been a dramatic rise in the number of cementless prostheses used (57%) with the incidence of cementless total knee replacements almost doubling (87%). This trend reflects an attempt to address the increased incidence of loosening and associated bone stock loss that occur with cemented prostheses in younger, more active patients. Patients today demand a stable but fully functional joint; however, the widespread use of cementless prostheses before their longer-term efficacy has been confirmed in carefully controlled clinical trials is cause for concern.

The incidence of TJR in South Africa is 0,02%. This is somewhere between the 0,1% of Western countries such as the USA and the UK and the <0,01% of developing countries. Concern has been expressed about the development of a two-tier health service in South Africa. We believe this is well founded. However, we accept that economic realities prevent the delivery of a high-technology service to the entire community. Nevertheless the diminishing number of TJRs carried out in teaching institutions is disturbing, and has potentially grave implications for the training of the next generation of orthopaedic surgeons. While the private sector plays a vital educational role within the academic institutions, current practice logistics militate against formal rotation outside these complexes.

Finally, the increased number of revisions performed annually is commensurate with the increased annual rate of TJR, and does not identify any dramatic time-related incidence of failure.

## Conclusion

Replacement arthroplasty of the major joints requires expensive sophisticated technology; accountability dictates that we should periodically carry out a surgical audit to establish surgical trends and success rates. These surgical procedures form an integral part of the training of young orthopaedic surgeons, and it remains important to identify educational priorities when allocating health care budgets.

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